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SPADES INTERACTIVE GRAPHICS

AT AVONDALE

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With over 25 years of experience in the shipbuilding industry, Mr. Cali founded Cali and Associates, a consulting firm for engineering and marine industrial computer applications. Prior to forming his own consulting company, he was Assistant Vice President for Engineering at Avondale Shipyards and Director of Engineering at Litton Ship System. Mr. Cali is a graduate of the Italian Naval Academy.

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The development of a production oriented Interactive Graphic version of the 'SPADES' System for N/C Lofting has been a team effort at Cali and Associates, Inc. with the help of Avondale Shipyards, Inc. personnel.

Special recognition must be given, however, to Mr. Lonnie Lowery of Cali & Associates, Inc. for carrying out the main development load, and to Mr. Lester Vicknair of Avondale Shipyards, Inc. for his help and dedication to the project.

Also, no success would have been possible without the advice and feedback from Mr. Vincent Nuzzo and his people at Avondale's Mold Loft.

GENERAL DESCRIPTION

When the decision was made to proceed with the development of the Interactive Graphics version of the 'SPADES' System, a list of requirements and goals was made.

One of the major considerations was to have total interchangeability between the graphic and the batch mode of the System such that rework could be processed easily, whether the original work had been done through the 'CRT' or in batch. As much as we would like to think otherwise, experience has taught us that changes and revisions are an ever present way of life during the ship design and construction process.

The requirement was also set that none of the 'SPADES' management and control features would be compromised because of the graphic.

In order for the graphic version to be a useful production tool, the user would have the capability of totally checking parts and/or burning tapes generated through the 'CRT' without having to wait for a drafting machine drawing and/or computer printout.

It was also decided that the user would have the capability of switching from one program to another directly from the tube without re-initializing any program at the central computer.

The plans called for four 'CRT's to be on simultaneously, and for at least one batch 'SPADES' program to be also running at the same time. This requirement caused the only major modification of the then existing 'SPADES' System in order to allow different programs to read and write records from the same data base at the same time.

I am happy to report that all of the above requirements have been met. Without going into a detailed description, we achieved this by the simple method of modifying the 'SPADES' System to work either in a batch or in an interactive graphic mode. In fact, the same executable module is called for at all times, regardless of the intended mode of processing the data.

By combining the use of virtual memory capability of the computer and judicious use of overlay, all the applicable programs have been linked together in one executable module. This was made easy by the fact that all 'SPADES' modules - in addition to using the same input handling routines and post processor - make extensive use, also, of common general routines; and therefore, no incompatibility existed between the various modules.

At the time the film was taken, the Shell Development Program had not been linked. This has now been done, and the new version including it is in production use at Avondale.

The development of the software started in September, 1974. The first version, including only the nesting, was put into production use in August, 1975, and the entire project completed in May, 1976.

HARDWARE CONFIGURATION

I. Mainframe Configuration:

**IBM 370/158 (Virtual Memory)
Actual Core Allocation - 1.5 Megabytes
Addressable Core Allocation - 16.0 Megabytes**

II. Disk Storage Configuration:

**IBM 3830. Storage Control
IBM 3330 Disk Storage Facility
IBM 3336 Magnetic Disk Pack (100 Megabytes Storage Per Pack)**

III. Graphic 'CRT' Configuration:

**IBM 2840 Display Control Unit
IBM 2944 Data Channel Repeater
IBM 2250 Display Unit (4 Units Per 2840).**

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